Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 91395

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Electronics and Communication Engineering

EC 2201/EC 32/EE 1204/080290008/10144 EC 302 — ELECTRICAL
ENGINEERING

(Regulation 2008/2010)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Write the working principle of self excited generators with a diagram.

2.   What are the factors that control motor speed?

3.   Draw the equivalent circuit of a transformer.

4.   Define regulation of a transformer. With expression and parameters.

5.   Define 'slip' of an induction motor.

6.   Draw the torque/speed curre of an induction motor.

7.   What are the uses of dampers?

8.   What is the principle of operation of Alternators?

9.   What is a substation?

10. List out the type of overhead line insulators.

PART B — (5 × 16 = 80 marks)

11. (a) (i)   Draw and discuss the no-load and load characteristics of a shunt
                generator.   (12)

          (ii) What is the significance of back emf in motor? Explain in brief with
                expression.   (4)

                                    Or

     (b) (i)   Brief up the necessity of a starter?   (4)

          (ii) Distinguish between shunt and series motors.   (4)

          (iii) In a brake test, the effective load on the brake pulley was 38.1 kg,
                the effective diameter of the pulley 63.5 cm and speed 12 r.p.s. The
                motor took 49 A at 220 V. Calculate its efficiency.   (8)

12. (a) Explain the construction and principle of operation of a transformer with neat diagrams. Also derive its emf equation. (16)

Or

(b) (i) With neat figures, discuss the open circuit and short circuit tests on transformer, and their purpose. (12)

(ii) Draw the vector diagram for a loaded transformer when load is non-inductive. (4)

13. (a) Explain the construction and principle of operation of three phase induction motor. (16)

Or

(b) (i) A 4 polo, 3-phase induction motor operates from a supply whose frequency is 50 Hz. Calculate the following ;

(1) the speed at which the field of the stator is rotating

(2) the speed of the rotor when the slip is 0.04

(3) the frequency of the rotor currents when the slip is 0.03.

(4) the frequency of the rotor currents at standstill. (6)

(ii) Explain why single phase induction motor is not self starting. (10)

14. (a) (i) What are the two types of rotors used in alternators? (4)

(ii) Derive the equation of induced emf of alternator. (4)

(iii) Find the synchronous impedance of an alternator in which a given field current produces an armature current of 200 A on short circuit and a generated emf of 50 V on open – circuit. The armature resistance is $0.1\,\Omega$. To what induced voltage must the alternator be excited if it is to deliver a load of 100 A at p.f. of 0.8 lagging, with a terminal voltage of 200 V. (8)

Or

(b) (i) Discuss the constriction and working principle of reluctance motor With appropriate diagram. (10)

(ii) Discuss the principle of stepper motor. With relevant diagram. (6)

15. (a) (i) Compare and contrast between EHVAC and EHVDC transmission systems. (8)

(ii) Write a detailed technical note on underground cables. (8)

Or

(b) Draw the typical layout of a substation and discuss the function of various equipment in it. (16)

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